

REMARKS

This paper responds to the Office Action dated April 18, 2008. Claims 1-73 are canceled and claims 74-88 are added such that claims 74-88 are now pending in this application.

Double Patenting Rejection

Claims 43-47 were provisionally rejected under a non-statutory obviousness-type double patenting rejection, specifically over claims 1-43 of co-pending U.S. Patent Application Serial No. 10/524,155. Applicant has canceled claims 43-47 such that the rejection is moot.

§103 Rejection of the Claims

Claims 1-73 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Uhlinger (U.S. Patent No. 6,190,556), Lien (U.S. Patent No. 4,802,982), and/or Robbins (U.S. Patent No. 6,190,558). Applicant has canceled claims 1-73 such that the rejection is moot.

New Claims 74-88

Applicant respectfully submits that the cited combination of references do not include any objective evidence as to a membrane element that includes first and second thin film composite membrane sheets which are separated a permeate carrier that has an H-value of about 0.045 atm-sec/gm or less such that the membrane element is capable of at least 50% MgSO₄ rejection of 500 ppm MgSO₄ in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F as recited in claim 74.

Lien

Applicant notes that Lien describes ultra-filtration membranes such that Lien does not disclose first and second thin film composite membrane sheets as recited in claim 74. In addition, Lien does not describe or even contemplate salt rejection by the disclosed ultra-filtration membranes.

As stated in the application, the improved thin film composite membrane elements in this invention not only show improved efficiencies which yield higher flow rates they also surprisingly show improved salt rejection rates. Lien did not contemplate or anticipate that improved permeate channels would lead to improved membrane rejection rates.

Uhlänger

Applicant notes that Uhlänger describes conventional membrane elements such that Uhlänger does not disclose a permeate carrier that has an H-value of about 0.045 atm-sec/gm or less as recited in claim 74. Applicant notes that the membrane elements which are disclosed in Uhlänger suffer from all of the drawbacks that are associated with conventional membrane elements (see Applicant's spec. at page 3, lines 13-30; page 4, lines 5-20; page 7, line 25 through page 8, line 4; and page 8, lines 9-10).

Applicant submits that claim 74 recites a novel and non-obvious combination of first and second thin film composite membrane sheets which are separated a permeate carrier that has an H-value of about 0.045 atm-sec/gm or less such that the membrane element is capable of at least 50% MgSO₄ rejection of 500 ppm MgSO₄ in DI water at 65 psi applied pressure at 10 cm/s average feed channel cross-flow velocity at 77 degrees F. The claimed membrane element meets the long felt need of a high flow membrane element that improves salt rejecting capability during relatively low pressure operation (see Applicant's spec. at page 4, line 21 through page 5, line 5; page 15, lines 6-20; and page 16, lines 13-19). In addition, the use of a permeate carrier that has an H-value of about 0.045 atm-sec/gm or less to separate first and second thin film composite membrane sheets provided unexpected and superior results (see Applicant's spec. at page 8, lines 10-20; page 9, lines 15-20; and page 12, line 28 through page 13, line 20) over conventional membrane elements.

Applicants submit that the A-values in column 2, lines 1-10 give reverse osmosis and nanofiltration A-values of about 7.6. Uhlänger mentions gfd/psi value of 0.11. Using an arbitrary pressure of 100 psi would therefore yield a flux of 11 gfd. This translates to an A-value of 7.6 (where the units of A-value are 10⁻⁵cm³/(cm²*atm)). A simple conversion is:

$$\text{A-value (in units of } 10^{-5}\text{cm}^3/(\text{cm}^2\text{*atm})) = [\text{gfd} * 69.3]/\text{psi}$$

Where psi is the driving pressure at the membrane surface (i.e., no osmotic pressure can be included).

Applicant notes that the A values disclosed in Uhlinger of 7.6 or less are below the value of 25 as recited in claim 79.

Robbins

Applicant respectfully submits that the A-value of the membranes used in Robbins are in the range of 10-17. Applicant notes that is impossible to calculate the A-value of the membranes disclosed in Robbins because there is no disclosure in Robbins relating to the active membrane area. Applicant further notes that Robbins provides no actual experimental data.

Applicant notes that it is Applicant's specification which provides the only objective evidence of using thin film composite membranes in combination with a permeate channel that has such a low flow resistance. This novel and non-obvious combination results in a membrane element that has unexpected flow rates and improved salt rejecting capability.

Reservation of Rights

In the interest of clarity and brevity, Applicant may not have equally addressed every assertion made in the Office Action, however, this does not constitute any admission or acquiescence.

Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (262) 646-7009 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 6 day of June 2008.

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